

THE IDENTITY OF THE SUPPOSED DASYURID MARSUPIAL, *SARCOPHILUS*
PRIOR DE VIS, 1883, WITH COMMENTS ON OTHER REPORTED 'PLIOCENE'
OCCURRENCES OF *SARCOPHILUS*

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ABSTRACT

The holotype of *Sarcophilus prior* De Vis, 1883, is redescribed and the specimen is shown to bear closer relationship with the family Vombatidae and in particular with the genus *Vombatus*, than with the family Dasyuridae. A re-examination of reported 'Pliocene' occurrences of *Sarcophilus* shows that these localities are, in fact, of late Pleistocene or Holocene age and that the referred specimens are assignable to either the late Pleistocene species, *S. lanarius*, or the living species, *S. harrisii*.

Stirton (1957) described a large dasyurid, *Glaucodon ballaratensis*, from a well near Smeaton, Victoria, which he suggested may represent an ancestral form leading to the genus *Sarcophilus*. The Smeaton site was considered by Gill (1957) to be pre-Holocene, either Pliocene or Pleistocene in age. On the other hand, Stirton (1957) suggested that if *Glaucodon* is in the direct line of ancestry of *Sarcophilus*, then the age of the Smeaton locality may be Miocene or even older. *Glaucodon* has recently been recorded from a late Pliocene or early Pleistocene locality along the Murray River, west of Mildura, New South Wales (Marshall, 1973), supporting a possible late Tertiary age for the Smeaton locality. This occurrence also suggests the contemporaneity of *Glaucodon* with the earliest *Sarcophilus*, recorded in 'Pliocene' sediments by De Vis (1883), McCoy (1882) and Stirton (1957). The present study deals with a redescription of *S. prior*, a re-evaluation of its taxonomic position and a re-examination of other specimens referred to *Sarcophilus* and assigned a 'Pliocene' age.

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Our special thanks are extended to Mr H. E. Wilkinson of the Victorian Geological Survey for drawing the authors' attention to the possible relationships of *S. prior* with the family Vombatidae and to Mr M. Archer of the Queensland Museum and Dr Richard H. Tedford of the American Museum of National History for valuable criticism.

Specimen numbers preceded by NMV are registered in the collections of the National Museum of Victoria, while those preceded by QM are housed in the Queensland Museum.

?*Vombatus prior* (De Vis, 1883)

(Pl. 26, figs. 1-5)

Sarcophilus prior De Vis, 1883, 187-90.

REVISED DESCRIPTION: Proximal end of right tibia, with maximum anterior posterior depth = 32.0 mm; maximum breadth = 29.0 mm; length from broken distal end of shaft to middle of intercondyloid eminence = 45.7 mm. The tibial tuberosity is broad and covered with rugosities dorsally. This surface dips ventrally at 45° relative to dorsal rim of medial condyle. The tibial crest is broad dorsally, narrowing slightly ventrally. The lateral fossa is relatively shallow. The medial condyle is larger than lateral and deeply basined dorsally. A shelf from the medial condyle extends posterolaterally behind base of intercondyloid eminence. The anterolateral and posterior edges of this eminence show breakage, although it does not appear as though much of the original surface is missing. The lateral condyle is relatively flat dorsally but its extent is reduced by breakage posteriorly and anterolaterally. Little of the posterior margin is believed missing and the lateral condyle did not extend greatly posterior to the intercondyloid eminence. The eminence is nipple-shaped and a small crest extends anteromedially to posterior edge of tibial tuberosity. The fibular facet is ovoid and situated on lateral face of lateral condyle. A sharp vertical cleft is present separating the median and lateral condyles, immediately posterior to intercondyloid eminence. Medial surface of shaft is flattened and a sharp rugose crest extends from medial edge of medial condyle ventrally onto posteromedial edge of shaft. The buttress below the medial condyle is only weakly developed.

DISCUSSION: ?*Vombatus prior* has been a *nomen dubium* since it was first described by De Vis (1883) within the genus *Sarcophilus*. The holotype, QM F743, the proximal end of an incomplete right tibia, was only briefly described by De Vis and comparison was made only with *S. ursinus* (= *S. harrisii*). Heavy mineralization and staining with oxides of iron suggest provenience with the late Pliocene Chinchilla Sand (Woods, 1956). Cranial remains of *Sarcophilus* have not been recorded from this Formation, but mandibular and maxillary specimens of other dasyurids, *Thylacinus* and the much smaller *Dasyurus*, have been recorded by Ride (1964) and Bartholomai (1971), respectively.

Compared with the living *S. harrisii* (NMV C6246, C6255 and QM J11282) there is a vertical furrow on the posteromedial surface of the shaft immediately below the medial condyle, a feature not seen in ?*V. prior*. The tibial tuberosity in *S. harrisii* has a pronounced anterolateral extension, while that in ?*V. prior* is markedly concave in this area

in proximal view. A distinct concavity appears dorsal to the lateral fossa. In addition, the fibular facet in *S. harrisii* faces more posteriad, not laterally as in ?*V. prior*. In actual size, *S. harrisii* is about one-third smaller.

In extant *Thylacinus* (NMV C5742 and C5741) the tibial fossa is deeper, the buttress below the lateral condyle is larger, the lateral condyle extends further posteriad and the cleft between the lateral and medial condyles is not as well defined as in ?*V. prior*. The fibular facet faces much more posteriad, while the proximal end of the tibia is proportionately deeper anterior posteriorly than in ?*V. prior*. There is a shelf from the medial condyle which extends posteriad to the intercondyloid eminence in both *Thylacinus* and *S. harrisii*, similar to that in ?*V. prior*, but both lack the posteromedial crest on the shaft below the medial condyle, seen in that species.

From the differences noted, it is apparent that the fossil tibia, QM F743, previously regarded as being referable to *Sarcophilus*, is markedly dissimilar to known larger dasyurids. Consideration of size is sufficient to exclude the extinct families Diprotodontidae and Thylacoleonidae in any re-assessment of the taxonomic position of the species, and in re-evaluating this position, only the families Vombatidae and Phascolarctidae need be compared, taking both size and morphology into account.

Phascolarctos (NMV C6728) has, however, a more convex medial surface, a smaller lateral fossa and a more anteriorly positioned lateral buttress.

Closest morphological comparisons in living marsupials are afforded by vombatids. ?*V. prior*, is similar to *Lasiorhinus* (NMV C6234, QM J9234 and QM J14051) in that the lateral buttress is poorly developed, the tibial tuberosity is broad and slopes sharply ventrally and the lateral condyle is short relative to the medial condyle. The intercondyloid eminence is longer antero-posteriorly in *Lasiorhinus latifrons* and *L. barnardi* and continues to the posterior edge of the medial condyle, lacking the shelving seen in ?*V. prior*. The fibular facet faces more posteriad. Measurements of the *Lasiorhinus latifrons* tibia (NMV C6234) are: maximum antero-posterior depth = 29.4 mm; maximum breadth = 29.2 mm. *L. barnardi* (QM J14051) corresponding dimensions are: 37.0 mm; 36.7 mm; these suggest a proportionately broader tibia than in ?*V. prior*.

In *Vombatus* (QM J10867) the lateral buttress is slightly better developed, the tibial tuberosity is only relatively slightly broader but both this genus and *Lasiorhinus* lack the posteromedial crest on the shaft below the medial condyle seen in ?*V. prior*. The intercondyloid eminence in *Vombatus* is more like that in *Lasiorhinus*. As in ?*V. prior*, however, the medial condyle is more shelf-like posterior to the eminence in *Vombatus*, while the fibular facet faces more laterally. Proportionately, the proximal end of the *Vombatus* tibia is more like that in ?*V. prior*. Measurements of the *Vombatus* tibia are: maximum antero-posterior depth = 35.8 mm; maximum breadth = 32.5 mm.

The evidence thus suggests that the tibia originally referred to *S. prior* shows closer affinities with the family Vombatidae than with other living and extinct marsupial families. Within the Vombatidae, a closer comparison is evident with *Vombatus* than *Lasiorhinus* among living forms. At present a number of fossil vombatids, apart from ?*V. prior*, are known in the Chinchilla Sand, including *Phascolonus*. Much of the post-cranial skeleton in *Phascolonus* has been described by Stirling (1913), including the tibia. Apart from size, this differs markedly in almost every detail in its morphology from ?*V. prior*. The post-

cranial skeleton in other fossil wombats is not well known and the present authors believe that reference of the species to ?*Vombatus* at this time is preferable to any alternative action which could be taken based on knowledge of other recognizable cranial remains in the late Pliocene Chinchilla Sand. *Vombatus* is recorded widely from the Pleistocene fluvial deposits of the eastern Darling Downs but cranial specimens have not yet been recorded from the Chinchilla Sand.

OTHER 'PLIOCENE' OCCURRENCES

McCoy (1882) reported *S. ursinus* (= *S. harrisii*) as abundant in the 'most recent Tertiary clays and in the various ossiferous caves of Victoria'. He referred to a specimen (NMV P7432, pl. 62, figs. 1-1b; and pl. 63, figs. 1-1d) collected from the 'Sandy beds intercalated with Pliocene Tertiary limestone near Queenscliff, in which the extinct Eared Seal, *Arctocephalus williamsi*, and the extinct wombat, *Phascolomys pliocenus*, occur'. These deposits are now recognized as no older than late Pleistocene and the specimen referred to as *A. williamsi* has been shown to be referable to the extant species *Neophoca cinera* (Gill, 1968). The specimen figured by McCoy (1882) in pl. 61, fig. 5 (NMV P1857) was collected from a cave, five miles southeast of Gisborne (Gisborne Cave) and was found in association with the dingo, *Canis familiaris dingo*. Gisborne Cave as well as the contained fauna has been shown to be of a Holocene age (Gill, appendix in Mahoney, 1964). The above specimens fall well within the size range of the living *S. harrisii* from Tasmania (Table 1).

In the original description of *G. ballaratensis*, Stirton (1957) referred to a *Sarcophilus* collected from the 'Pliocene' at Kalamurina, from the Warburton River of northeastern South Australia. Stirton noted that this specimen showed a closer relationship to *S. laniarius* than to the living *S. harrisii*. Dr R. H. Tedford (pers. comm.) has informed us that the age of the Kalamurina locality has been reassessed and that further collections in this area have yielded a late Pleistocene *Diprotodon optatus* fauna. Stirton (1957) gave measurements of the specimen he referred to *Sarcophilus* showing that it was larger than the living species, *S. harrisii*, and slightly smaller than the specimen of *S. laniarius* with which he compared it. It is believed that this specimen could well prove referable to *S. laniarius*.

The genus *Sarcophilus* is represented by a single living species, *S. harrisii*, which survives today only in Tasmania. This species was reported as being present on the mainland from remains located in a midden at Tower Hill Beach, western Victoria, dated as recently as five centuries ago (Gill, 1953). This date has recently been amended by Gill (1971) and it has been shown that this site actually dates from about five thousand years ago. An extinct species, *S. laniarius*, is reported from late Pleistocene deposits throughout eastern Australia and Tasmania and, except for being larger in size, is indistinguishable from *S. harrisii*. A discussion of the distribution and relationships of these species is given by Calaby and White (1966). It is generally agreed that *S. laniarius* may be regarded as a larger ancestral form of *S. harrisii* (Calaby and White, 1966; Lydekker, 1887; Ride, 1964).

TABLE 1
 POPULATION PARAMETERS FOR SOME CRANIAL AND MANDIBULAR CHARACTERS OF
 A LIVING SAMPLE OF *Sarcophilus harrisii* FROM TASMANIA, COMPARED
 WITH SPECIMENS OF HOLOCENE AGE FROM VICTORIA.

| Tooth dimension | Living Specimens, Tasmania | | | | | Holocene, Victoria | |
|---|----------------------------|-----------|-----------|-------|-------|--------------------|--------------|
| | N | O.R. | \bar{X} | s | V | NMV P7432 | NMV P1857 |
| P ¹ length | 23 | 4.4- 5.5 | 4.84 | 0.292 | 6.03 | 4.5 | — |
| max. width | 23 | 4.4- 5.2 | 4.91 | 0.227 | 4.62 | 4.9 | — |
| P ² length | 27 | 6.0- 6.8 | 6.51 | 0.178 | 2.73 | 6.0 | — |
| max. width | 27 | 5.3- 6.4 | 5.80 | 0.228 | 3.93 | 5.7 | — |
| M ¹ length | 27 | 11.0-11.9 | 11.49 | 0.268 | 2.33 | 11.1 | — |
| max. width | 26 | 8.6- 9.7 | 9.23 | 0.281 | 3.04 | 9.0 | — |
| M ² length | 27 | 12.1-13.0 | 12.47 | 0.209 | 1.68 | 12.2 | — |
| max. width | 25 | 9.3-10.5 | 9.98 | 0.357 | 3.58 | 10.3 | — |
| M ³ length | 27 | 11.3-12.4 | 11.81 | 0.274 | 2.32 | 12.8 | — |
| max. width | 26 | 9.5-10.7 | 9.91 | 0.366 | 3.69 | 10.4 | — |
| M ⁴ length | 26 | 7.5- 9.0 | 8.34 | 0.448 | 5.37 | 7.9 | — |
| max. width | 26 | 3.4- 4.1 | 3.67 | 0.199 | 5.42 | 4.4 | — |
| M ¹⁻³ length | 27 | 33.4-36.1 | 35.04 | 0.635 | 1.81 | 35.4 | — |
| P ₁ length | 27 | 6.5- 7.4 | 6.93 | 0.231 | 3.33 | 6.4 | — |
| max. width | 27 | 4.0- 5.0 | 4.50 | 0.318 | 7.07 | 4.2 | — |
| P ₂ length | 27 | 6.5- 7.6 | 7.19 | 0.248 | 3.45 | 6.8 | 6.9 |
| max. width | 27 | 5.1- 6.0 | 5.66 | 0.275 | 4.86 | 5.7 | 5.5 |
| M ₁ length | 27 | 8.3- 9.3 | 9.00 | 0.245 | 2.72 | 8.8 | 8.5 |
| max. width | 27 | 6.0- 7.0 | 6.31 | 0.246 | 3.90 | 6.4 | 6.5 |
| M ₂ length | 27 | 10.0-10.6 | 10.19 | 0.183 | 1.80 | 10.0 | 9.5 |
| max. width | 27 | 6.2- 7.3 | 6.64 | 0.281 | 4.23 | 7.3 | 7.0 |
| M ₃ length | 27 | 11.2-12.4 | 11.59 | 0.276 | 2.38 | 11.1 | 11.0 |
| max. width | 27 | 6.4- 7.3 | 6.73 | 0.193 | 2.87 | 7.0 | 6.9 |
| M ₄ length | 27 | 10.7-12.2 | 11.46 | 0.441 | 3.85 | 11.3 | 11.0 |
| max. width | 26 | 5.9- 7.0 | 6.33 | 0.316 | 4.99 | 6.7 | 6.6 |
| M ₁₋₄ length | 27 | 39.7-42.8 | 41.30 | 0.880 | 2.13 | 40.3 | 39.8 |
| Breadth of mandible .. | | | | | | | |
| below M ₃ | 27 | 9.3-11.8 | 10.34 | 0.677 | 6.55 | 10.3 | 10.3 |
| Depth of mandible below M ₃ | 27 | 15.0-24.7 | 20.72 | 2.075 | 10.01 | 20.3 | 18.4 |

CONCLUSION

A reassignment of the holotype of *S. prior* within *Vombatus* and reinterpretations of previously reported 'Pliocene' occurrences of *Sarcophilus* show that there are no specimens of this genus which may be definitely assigned to a Pliocene age. *S. lanianus* is the earliest known representative of this genus and is presently recorded only from presumably late Pleistocene deposits. In line with this evidence, *Glaucodon*, as proposed by Stirton (1957), may be regarded as being in the direct line of ancestry to *Sarcophilus* and still come from deposits of a Pliocene-Pleistocene age, this age being supported by a late Pliocene occurrence of *Glaucodon* in Marshall (1973).

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